Claims

1. A composite material comprising a porous semiconductor impregnated with at least one beneficial organic substance, wherein the beneficial organic substance is present in an amount of at least 15 % by weight, based on the weight of the material.

2. A material according to claim 1 wherein the porous semiconductor is doped or undoped silicon, germanium, silicon carbide or silicon nitride

3. A material according to claim 2 wherein the porous semiconductor is silicon

4. A material according to claim 3 wherein the silicon is resorbable

5. A material according to claim 4 where the silicon is mesoporous

6. A material according to any of claims 3 to 5 wherein the porous silicon has a porosity of from 40% to 90%

7. A material according to any preceding claim wherein the beneficial organic substance has a solubility in aqueous media of no more than 10mg/mL at pH range 1-7.

8. A material according to any preceding claim wherein the beneficial organic substance has a melting point of below 300°C.

9. A material according to claim 8 wherein the beneficial organic substance has a melting point of below 100°C

10. A material according to any preceding claim wherein the beneficial organic substance is selected from chlorambucil, amitriptyline, ibuprofen , procaine, levamisole, plumbagin, cyclophosphamide, busulfan, dexamethasone , lauric acid, medroxy progesterone acetate, vitamin K, vitamin E, paclitaxel and rifampicin or a mixture thereof.

11. A material according to any preceding claim wherein the beneficial organic substance is present in an amount of from 15% to 85% by weight, based on the weight of the material.

12. A material according to any preceding claim wherein the beneficial organic substance is distributed substantially uniformly through the pores of the semiconductor.

13. A pharmaceutical composition comprising a material according to any preceding claim

14. A pharmaceutical composition according to claim 13 in the form of an implant or particles.

15. Use of a material according to any of claims 1 to 12 or a composition according to claim 13 or claim 14 in therapy

16. A method of delivering a beneficial substance to a patient in need thereof comprising delivering to the patient a composition according to claim 13 or claim 14.

17. A method for preparing a composite material comprising a porous semiconductor impregnated with at least one beneficial organic substance, wherein the beneficial organic substance is present in an amount of at least 15% by weight based on the weight of the composite material, comprising the steps of:-

i) bringing the beneficial organic substance into contact with the porous semiconductor; and

ii) allowing the beneficial organic substance to impregnate the porous semiconductor, the impregnation being performed at a temperature which is at or above the melting point of the beneficial organic substance.

18. A method according to claim 17 wherein the impregnation is brought about by the steps of:-

i) heating the porous semiconductor to a temperature at or above the melting point of the beneficial organic substance;

ii) bringing the beneficial organic substance into contact with the heated porous semiconductor, thereby causing the beneficial organic substance to become molten; and
iii) allowing the molten beneficial organic substance to impregnate the porous semiconductor.

19. A method according to claim 17 wherein the impregnation is brought about by the steps of:-
i) heating the beneficial organic substance to a temperature at or above its melting point, thereby causing the beneficial organic substance to become molten ;
ii) bringing the molten beneficial organic substance into contact with the porous semiconductor; and
iii) allowing the molten beneficial organic substance to impregnate the porous semiconductor.

20. A method according to claim 17 wherein both the porous semiconductor and the beneficial organic substance, independently, are heated to a temperature at or above the melting point of the beneficial organic substance and then brought into contact together to allow impregnation to occur.

21. A method according to any one of claims 17 to 20 wherein the impregnation is performed at a temperature of from 40°C to 200°C.

22. A method according to claim 21 wherein the impregnation is performed at a temperature of from 60°C to 130°C

23. A method according to any one of claims 17 to 22 wherein the impregnation is performed at a temperature of from 5°C to 15°C above the melting point of the beneficial organic substance.

24. A method for preparing a composite material comprising a porous semiconductor impregnated with at least one beneficial organic substance, wherein the beneficial organic substance is present in an amount of at least 15% by weight based on the weight of the composite material, comprising the steps of:-

i) dissolving the beneficial organic substance in a solvent for the beneficial organic substance;

ii) bringing the solution of part(i) into contact with the porous semiconductor ; and

iii) allowing the beneficial substance to impregnate the porous semiconductor, the impregnation being performed at a temperature in the range of from 40°C to 200°C .

25. A method according to claim 24 wherein the impregnation is performed at a temperature of from 60°C to 130°C

26. A method according to claim 24 or 25 wherein the impregnation is performed at a temperature which is at or above the boiling point of the solvent for the beneficial substance

27. A method according to any one of claims 24 to 26 wherein the impregnation is performed at a temperature which is at or above the melting point of the beneficial organic substance.

28. A method according to any one of claims 24 to 27 wherein the impregnation is brought about by the steps of:-

i) dissolving the beneficial organic substance in a solvent for the beneficial organic substance;

ii) heating the porous semiconductor to the temperature at which impregnation is to be performed;

iii) bringing the solution of part(i) into contact with the heated porous semiconductor ; and

(iv) allowing the beneficial substance to impregnate the porous semiconductor

29. A method according to any one of claims 24 to 27 wherein the impregnation is brought about by the steps of:-

i) dissolving the beneficial organic substance in a solvent for the beneficial organic substance;

ii) heating the solution of part (i) to the temperature at which impregnation is to be performed;

iii) bringing the heated solution of part(ii) into contact with the porous semiconductor ; and

(iv) allowing the beneficial substance to impregnate the porous semiconductor

30. A method according to any one of claims 24 to 27 wherein both the porous semiconductor and the solution of beneficial organic substance, independently, are heated to the temperature at which impregnation is to be performed and are brought into contact together to allow impregnation to occur.

31. A method according to any of claims 17 to 30 wherein the semiconductor is silicon

32. A method according to any of claims 17 to 31 wherein the beneficial organic substance has a melting point of below 300°C

33. A method according to any of claims 17 to 32 wherein the beneficial organic substance is selected from chlorambucil, amitriptyline, ibuprofen , procaine, levamisole, plumbagin, cyclophosphamide, busulfan, dexamethasone , lauric acid, medroxyprogesteron acetate, vitamin K, vitamin E, paclitaxel and rifampicin or a mixture thereof.

34. A method according to any of claims 17 to 33 wherein the porous semiconductor is heated to a temperature of from 100°C to 250°C prior to being brought into contact with the beneficial organic substance.

35. A method according to any one of claims 17 to 34 wherein the porous semiconductor and beneficial organic substance are maintained in contact for a period of from 1 minute to 2 hours.